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Rear Admiral Bartholomew W. Hogan MC USN - Surgeon General
 Captain Donald R. Childs MC USN - Editor

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Policy

The U. S. Navy Medical News Letter is basically an official Medical Department publication inviting the attention of officers of the Medical Department of the Regular Navy and Naval Reserve to timely up-to-date items of official and professional interest relative to medicine, dentistry, and allied sciences. The amount of information used is only that necessary to inform adequately officers of the Medical Department of the existence and source of such information. The items used are neither intended to be, nor are they, susceptible to use by any officer as a substitute for any item or article in its original form. All readers of the News Letter are urged to obtain the original of those items of particular interest to the individual.

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Surgery for Cancer of the Gastrointestinal Tract

Surgery for cancer of the gastrointestinal tract has not remained static over the last 25 years. With the advent of safe blood transfusions, antibiotics, understanding of fluid and electrolyte balance, plus better anesthesia, great strides have been made. These factors alone are paramount in the progress achieved. Most present-day procedures were attempted and described in great detail after the beginning of the renaissance of surgery in the late nineteenth and early twentieth centuries only to be discarded because of the exceedingly high incidence of infection, shock, and electrolyte disturbances which resulted in high morbidity and mortality. Now, many of these old surgical techniques have justly been revived and improved.

MALIGNANT LESIONS OF THE STOMACH

For purposes of discussion, carcinoma of the stomach can be divided logically into two categories according to the location of the lesion. The treatment of choice is adequate surgical resection when possible. Radical surgical treatment for cancers of this region was conceived early in the history of surgery of the stomach, but the procedure has been used only sporadically until the past 25 years.

Carcinoma of the Cardia and Fundus. Apparently, the first successful cardiectomy in a human being was accomplished by Voelcker in 1908. Von Mikulicz, in 1904, and Sauerbruch, in 1906, unsuccessfully made the transpleural approach. It was not until several years later that a patient survived this approach, and many other surgeons have contributed to further improvement of this technique.

Marshall introduced to the United States the technique of transthoracic transdiaphragmatic resection of the cardia with immediate esophagogastrectomy,

and accomplished the first successful cardiectomy in 1937. However, Garlock, appreciating the applicability of the transthoracic approach, persevered in urging its adoption. Subsequently, he recommended preliminary laparotomy to determine resectability of the tumor and this later combined technique has come to be the operation of choice for carcinoma of the cardia.

Carcinoma of the Stomach Excluding the Cardia. In 75% of the cases of carcinoma of the stomach, the lesions are found in the distal third. Total gastrectomy is necessary in some patients because of proximal extension of the tumor in the stomach. In these cases, esophagoduodenostomy may be performed, but more commonly esophagojejunostomy proves to be the procedure of choice.

The difficulties in applying the concepts of good cancer surgery to radical extirpation of carcinoma in the remaining portion of the stomach become immediately evident when the anatomy involved is considered. The stomach and its lymphatics are so intimately related to contiguous structures that the scope of an ideal operation for cancer would probably exceed that of a combined Whipple procedure and total gastric resection.

The high incidence of involvement of subpyloric nodes in the short-term survivors is important in the controversy of routine total versus subtotal gastric resection. This is an important contribution because it implies that nodal recurrence in the region of the head of the pancreas is the primary cause of the failure of subtotal resection to cure cancer of the distal segment of the stomach. The trend has been toward more radical resection in the hope of improved results. It has been accompanied by a mortality rate that has been nearly twice as high as the rate for subtotal gastrectomy, as well as by increased nutritional problems, loss of weight, post-prandial discomfort, dumping, and anemia. Total resection should be used only in selected cases.

There is no evidence that recurrence of cancerous lesions is common in the remaining portion of the stomach. Radical subtotal resection, which includes resection of the spleen and omentum and adequate removal of lymph nodes, seems to be the procedure of choice at the time of this study.

MALIGNANT LESIONS OF THE SMALL INTESTINE

Because malignant tumors in the small bowel are rare, most reports in the literature are limited to single cases. In a study of 108 cases of such lesions at the Mayo Clinic between 1907 and 1939, it was found that they represented only 0.5% of all malignant lesions of the gastrointestinal tract. The cancerous lesions of the small intestine are of two principal types: (1) the ordinary type such as seen in the colon; and (2) carcinoid tumors (adenocarcinoma of the carcinoid type). Cancer of the appendix is encountered in one of 200 cases.

Carcinoma of the Duodenum. The first type of cancerous lesion of the small intestine develops most frequently in the duodenum, especially in the

second portion at or near the ampulla. These cancers, in all probability, originate in the bile or pancreatic ducts and are not true primary duodenal cancers. They account for slightly more than 80% of all duodenal cancers. Most of the other cancerous lesions of the duodenum are found in its third portion.

Whipple's operation has been employed for carcinoma of the duodenum, although employed also for carcinoma of the head of the pancreas and bile ducts. Its greatest success has been with carcinoma of the ampulla and is currently being utilized as a one-stage procedure. Many variations in surgical technique of procedures of this region have been suggested.

Carcinoma of the Jejunum and Ileum. Cancers of the jejunum and ileum are not as common as those of the duodenum and have no special features. There seems to be universal agreement that the treatment of these lesions is wide resection in continuity of the involved bowel, wedge of mesentery, and the regional nodes. Resection, if possible, should be carried out even when metastasis is present, since in such cases, a potentially bleeding, ulcerating, obstructing lesion is removed with improvement of general health and nutrition. A pessimistic attitude need not be assumed, for occasionally the nodes are only inflamed. The route of metastatic spread has been described as including the mesenteric nodes, peritoneum, liver, lungs, long bones, and dura mater in the order named.

Carcinoids. Treatment of this type of tumor represents one of the prime examples of advancement made in the field of intestinal surgery in the past 25 years. Although recognized by early pathologists, the lesions were thought to be benign. About 5 years ago, it was discovered that some were functioning, in that they secreted serotonin, while earlier it was recognized that they could metastasize.

Carcinoids have their highest incidence in the appendix followed in order of frequency in the ileum, cecum, jejunum, colon, and stomach. They are ulcerated only late in the disease and rarely metastasize, although peritoneal involvement is not infrequently found. The neoplasms are multiple in 30% of the cases, and metastasis to nodes and liver is observed in no less than 20%. Practically all carcinoids are Grade I cancers arising from specialized glandular cells which are the positive silver-staining cells of Kulchitsky.

Secreting carcinoids have given rise to the carcinoid syndrome—flushing, diarrhea, perspiration, asthma, hypertension, palpitation, and similar sympathomimetic responses. Radical resection is the preferred treatment, since patients can live for many years even with the presence of metastasis. Some authors are of the opinion that carcinoids are radiosensitive.

MALIGNANT LESIONS OF THE LARGE INTESTINE

The developments of the past 25 years have paved the way for more feasible surgery of the colon than of any other portion of the gastrointestinal tract. Mortality, morbidity, and hospitalization have shown the greatest drop.

Technical methods of surgery became established in the early part of the twentieth century, and after the advent of chemotherapy in 1939, during one year's time the mortality rate decreased greatly by the mere use of sulfanilamide drugs in the peritoneal cavity. At the present time, with the advantages of other significant discoveries, it has been possible to effect definite technical changes in dealing with lesions of the colon.

Carcinoma of the Right Portion of the Colon. One-stage resection and anastomosis without complemental ileostomy are used in practically all cases. There may be a rare case in which a multiple-stage procedure may still be the operation of choice.

Carcinoma of the Left Portion of the Colon. Resection with intra-peritoneal anastomosis was too hazardous until about 1940. Today, the one-stage procedure is used almost entirely. Surgical techniques have become more radical as studies have demonstrated the characteristic spread of carcinoma via venous and lymphatic channels.

Carcinoma of the Rectum. Time has also witnessed the transition of the abdominoperineal resection into a one-stage procedure. The past 25 years have been of the greatest benefit to low anterior resection which, because exteriorization of this portion of the colon had been impossible, had previously a disappointing mortality rate. Operations such as the "low low" anterior resection, Black's endorectal procedure, and the "pull-through" operations, have found a place in the armamentarium of the present-day surgeon. It would be remiss not to point out that the increasing frequency and accuracy of proctoscopic examination of the present day has contributed as much as anything to the decreasing mortality from carcinoma of the colon. The experience of one group has shown a 50% five-year survival from conservative treatment of visualized malignancies, employing fulguration plus radium when surgery was impossible or refused.

Familial Polyposis. The possibility of malignant development in familial polyposis is 100% if given enough time. With the advent of antibiotics, one-stage ileosigmoidectomy, followed by fulguration, has been used while some eminent surgeons feel that total colectomy with ileostomy should be employed. The former is more frequently used and has yielded excellent results if the patient submits to proctoscopic examinations at six-month intervals. There is no argument as to procedure if carcinomatous changes have already occurred in the rectum. (Mayo, C. W., Nixon, J. W. Jr., A Review of Important Contributions of Surgery for Cancer of the Gastro-intestinal Tract: Am. J. Digest. Dis., 4: 401-411, June 1959)

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Respiratory Function in Surgical Patients

Attention to well-known details of postoperative care has resulted in a decreased incidence of pulmonary complications. Such complications, nevertheless, continue to be a significant cause of postoperative morbidity and mortality in all major surgery. A reasonable way to reduce them further lies in the preoperative detection and correction of ventilatory insufficiency. Although history, physical examination, and x-ray examination of the chest may suggest such insufficiency, evaluation based on these measures alone may fail to detect significant ventilatory defects in some patients. Two recently proposed methods which do provide a simple and accurate evaluation of pulmonary function are the cough analysis developed by Greene and the ventilatory function testing system of Miller. These methods correlate well with "pulmonary risk."

At the time of the initial physical examination, all patients are questioned specifically regarding smoking habits, a history of exertional dyspnea, asthma, chronic or morning cough, and respiratory infection; and a record is made of the anteroposterior diameter of the chest in addition to the velocity and volume of chest excursion. A routine posteroanterior and lateral x-ray of the chest is obtained.

All patients are then subjected to cough analysis by the method of Greene which is performed by observing a voluntarily induced cough. An induced cough that is normal is single, brief, and nonproductive. In contrast, the abnormal cough may be self-propagating or productive. The abnormal cough may be rated from one to four according to these characteristics.

Patients with a history of suspicious pulmonary disease, with abnormal physical examinations or x-rays, or with abnormal induced coughs receive the quantitative pulmonary evaluation of Miller. This ventilatory function testing system is based on two simple determinations: vital capacity and 0.5 second expiratory capacity. Both of these are determined by having the patient expire forcibly from a position of maximum inspiration, measuring the total amount expired in addition to the amount expired in the first 0.5 second. Both values can be obtained with a Collins respirometer or a Gaensler-Collins timed vitalometer. These determinations require a minimum of patient cooperation and can be conducted by a technician. To relate the patient's function to predicted norms, these two values are plotted as the ratio of the patient's vital capacity to the predicted vital capacity and as the ratio of the patient's 0.3 second expiratory capacity to the measured vital capacity. These two parameters have been chosen because all ventilatory insufficiency—regardless of its source—is reflected either in a diminished vital capacity or in a decreased rate of pulmonary air flow of which the 0.5 second expiratory capacity is a measure. This system provides a graphic representation of the nature and degree of a patient's ventilatory inadequacy. The results are then plotted, and the patient is placed in the category of good, poor, or prohibitive "pulmonary risk."

All patients outside the normal range, as well as those with a positive cough analysis, are placed on a therapeutic regimen. This includes: (1) cessation of smoking; (2) a schedule of treatment with a wetting agent and bronchodilator; (3) treatment of any specific respiratory infection; (4) use of expectorants; (5) training in effective cough; (6) prophylactic aminophylline suppository prior to surgery when indicated; and (7) careful and complete respiratory toilet on the morning of operation.

During a six-month period there was major surgery performed on 250 patients following the application of the described routine, the results of which were included in the authors' report. Preanesthetic medication was sufficient only to insure psychic sedation. Narcotics were avoided when possible. Secobarbital and scopolamine were the drugs most commonly used. Postoperatively, all patients were placed on a "stir-up" regimen and given only minimal amounts of analgesic drugs.

Of the 250 receiving surgery, 48 (19%) had a sufficiently suspicious screening evaluation to warrant quantitative testing. Forty of this group had significant ventilatory defects and were placed on the therapeutic regimen with therapy ranging from 3 to 21 days. Improvement in induced cough, ventilatory functions, or both were noted in 35 of the 40 patients. Only 2 of the 250 patients developed postoperative atelectasis or pneumonia, the latter dying from extensive bronchopneumonia following an esophagectomy.

The authors made no attempt to correlate preoperative evaluation with postoperative complications in treated and untreated patients, although they quoted Greene as having demonstrated that such complications were nine times as common in patients with abnormal induced coughs as in those without. Miller was quoted as showing a similar correlation in relation to the quantitative evaluation of pulmonary ventilation. It was considered that these correlations were reasonable since the prime etiologic factors leading to pulmonary complications are (1) bronchial hypersecretion usually resulting from the irritation of tobacco or infection and, (2) the inability to clear secretions by coughing.

By providing a good measure of relative pulmonary risk preoperatively, the regimen outlined serves three purposes: (1) It adds a quantitative value to the many clinical impressions that the surgeon and internist must weigh in relation to surgery for any patient. (2) It allows for the selection of patients whose pulmonary vulnerability is great enough to justify careful preoperative respiratory preparation. (3) The patient's progress can be followed by repeating the evaluation at intervals.

Although the group of patients presented was not sufficient to demonstrate the value of the program on a statistical basis, it does point out the prevalence of significant pulmonary risk in a group of general surgical patients. Furthermore, the results suggest that proper therapy will lower morbidity and mortality. (Veith, F.J., Rocco, A.G., Evaluation of Respiratory Function in Surgical Patients: Importance in Preoperative Preparation and in the Prediction of Pulmonary Complications: *Surgery*, 45: 905-911, June 1959)

Conservative Treatment for Acute Cholecystitis

The choice of treatment for acute cholecystitis has and still does provide reason for discussion. As in other conditions, there is the choice between immediate operation and conservative treatment. The latter is usually followed by surgery at a time of election and after diagnostic studies have been done. Immediate operation presumes a correct but frequently unconfirmed diagnosis and accepts the hazards of surgery not of election. It offers a substantial reduction in hospital stay. Conservative treatment with operation delayed accepts the dangers of gallbladder perforation or pericholecystic abscess and offers possible operation of election. Which method of treatment offers the best care for the patient is still open to discussion. This statement is particularly true if it is realized that principles of treatment which are excellent for one institution may be most harmful if applied indiscriminately to other hospitals.

Glenn, Ochsner, Reines, and others urge prompt surgery. Mulholland Zollinger, and Collier speak for another group which may be termed "conservative" with the qualification that individual case evaluation is necessary to recognize the failure of conservative treatment. From reports of immediate surgery it is difficult to ascertain the percentage of patients that could not be readied safely for immediate surgery. Reports of the conservative treatment indicate a variation in the number of cases requiring emergency surgery for uncontrolled disease, urgent surgery for failure to improve, and the number treated by surgery of election. This variation could be explained by the difference between "watching" acute cholecystitis and "vigorous conservative treatment."

Although improvement has occurred with proper treatment—gastric suction, intravenous fluids, and sedation instead of "watching"—there are cases still not energetically treated.

It has been pointed out that the majority of gallbladder disease is not treated in medical centers. What, then, is the wisest policy to adopt for the average community hospital?

In defense of the conservative approach, the authors report on 752 patients who were treated for biliary tract disease at the community hospital of their practice. They stress that no patient needing treatment for acute cholecystitis languished or died on the medical service and that surgical consultation was obtained for all problem cases of acute cholecystitis.

During the five-year period of their report, 345 of the 752 patients were treated for acute cholecystitis. None was treated by "immediate, prompt, or early surgery," meaning surgery performed as quickly as the condition of the patient would permit. All operated upon within 72 hours of their admission were treated as of necessity. Therefore, acute cholecystitis was treated conservatively in all patients, meaning that the operation was delayed if possible until the disease was quiescent and the indicated

diagnostic studies were completed. If delay was not possible, surgery was done as an emergency or considered to be urgent during the course of treatment.

Of the 345 cases of acute cholecystitis, 154 (44.3%) were discharged without operation, and 30% of those discharged returned for later surgery. The possible impact of immediate operation on this group cannot be stated except that the mortality could not have been less since there were no deaths. If immediate surgery should be adopted as a hospital policy, much ill-advised surgery would be done. In contrast, conservative treatment, done without mortality in this group, offers restraint to the surgeon and for the patient a better medical evaluation.

Operation during the initial hospitalization was performed on 191 of the series. There were 9 deaths, 3 following cholecystectomy and 6 following cholecystostomy, for a total mortality rate of 4.7%, the cholecystostomy group having the highest mortality figure (18.7%)

In one survey of deaths following gallbladder surgery, there was noted a sharp drop in those causes related to the surgery itself—shock, hemorrhage, and infections—and increase in cardiovascular and pulmonary deaths. Hepatic insufficiency remained the same. Glenn attributes the lack of infection as a cause of death to the policy of immediate surgery, eliminating rupture and pericholecystic abscess. With conservative treatment in the series of the present report, rupture of the gallbladder occurred 4 times and pericholecystic abscess 6 times with no effect on mortality. Therefore, these possible complications do not seem valid arguments for immediate surgery. The causes of death in this series were those hazards of any surgery in the aged. At the risk of increasing unnecessary surgery in community hospitals, the benefits of cholecystectomy in younger patients with known gallbladder disease must be emphasized, but it is strongly doubted that immediate surgery in the aged and poor-risk patient will improve the poor results in this group of patients.

Immediate surgery as a policy for services in teaching institutions can be as sound as the control of the clinical material. As a policy for the average community hospital where the majority of gallbladder surgery of this country is done, it could lead to much ill-advised surgery. In community hospitals, certain individuals of outstanding ability can certainly apply the principle of immediate surgery to their own practice with success, but they must also take the responsibility for their imitators. (McCubbrey, D., Thieme, T., *In Defense of the Conservative Treatment for Acute Cholecystitis with an Evaluation of the Risk: Surgery*, 45: 930-936, June 1959)

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Bethesda 14, Md., giving full name, rank, corps, and old and new addresses.

Acids - Biochemical and Economic Considerations

The current interest in anticholinergic drugs has diverted attention from the importance of antacids in the management of peptic ulcer. With the development of the synthetic anticholinergics has come the assumption that these drugs are in themselves adequate for the treatment of ulcer. However, the evidence indicates that they do not adequately diminish the acid secretion in the ulcer patient, and that chemical neutralization of hydrochloric acid must still be relied on as the keystone of ulcer management.

Any substance which will combine chemically or physically with hydrochloric acid will—if given in sufficient amounts—annul the injurious effects of the acid. Some of these substances may have characteristics which render them impractical or even impossible for clinical application. Thus, the first requirement of an antacid is that it be harmless, either directly or indirectly. All the neutralizing preparations now in use meet this requirement, with the exception of sodium bicarbonate, which is potentially harmful in that it may cause alkalosis, although this danger is probably overrated.

The next most important requirement of an antacid is that it should be palatable. Only a little less significant is the possibility of interference with bowel function. A troublesome property of aluminum hydroxide and calcium carbonate is that they are constipating. Preparations such as sodium carboxymethyl-cellulose and the resins usually do not interfere with bowel function.

Of great therapeutic importance is the rate and duration of antacid effect. Evaluation of this property of antacids is complicated by the wide discrepancy between in vivo and in vitro action, mainly because of the variations in gastric emptying. It is commonly assumed that because an antacid reacts slowly with acid in vitro it will produce prolonged neutralization in vivo. There is no logic to this conclusion. The duration of in vivo action of an antacid is dependent on (1) its total acid-combining capacity, and (2) the length of time it remains in the stomach.

Convenience of administration is a matter of practical significance while the cost per day or per course of treatment is frequently more important to the patient than the therapeutic effectiveness.

The objective of antacid therapy is to inhibit acid corrosion and peptic digestion of the ulcerated area. It is unclear which is primary in the ulcerative process. Certain work suggests that peptic digestion occurs only after acid corrosion. Others have felt that peptic digestion is primary, and acid is essential only to provide a suitable pH for pepsin activity.

From the knowledge available regarding neutralizing power and rate of gastric emptying, doses of antacid given four times daily or only with meals cannot be expected to approach the therapeutic objective in a peptic ulcer patient. On the Sippy regimen it has been calculated that considerably more than the theoretical amount of antacid must be given to achieve neutralization

in a given period. There is as little rationale in giving an "occasional" dose of neutralizer to an ulcer patient as there is in giving an "occasional" injection of insulin to a diabetic. This attitude comprises the most prevalent error in the management of peptic ulcer. Neutralization is most needed in the postprandial period when acid begins to rise following the depressive effect of a meal. To administer antacid only when symptoms are present is to defeat the prime objective of ulcer therapy—the prophylactic maintenance of conditions suitable for healing.

CHARACTERISTICS OF PRINCIPAL ANTACIDS

Calcium Carbonate. This substance is an important component of the original Sippy regimen and is advocated by many experienced clinicians as the antacid of choice. It reacts rapidly with acid of the stomach to form calcium chloride which is then converted in the intestine to insoluble calcium salts and eventually excreted in the feces, leaving the remaining chloride to be reabsorbed. The theoretical neutralizing capacity is high, and the cost is the lowest of any of similar agents employed. The most disturbing side effect is constipation which can be counteracted with a laxative agent. Nausea is an occasional complaint, and because of formation of carbon dioxide, eructation and flatulence are noted by some individuals. Objections to the use of this antacid for prolonged therapy are generally based on the fear of (1) "rebound" secretion, (2) alkalosis, or (3) formation of urinary calculi. The occurrence of the first objection has not been proved and systemic alkalosis during administration of calcium carbonate is only rarely observed except in the presence of chloride loss, as in repeated vomiting or gastric aspirations. The normal kidney is apparently capable of dealing with the alkalinizing effect. As for urinary calculi, the reports of several series do not substantiate any significant increase of frequency unless the regimen also includes a high content of sodium bicarbonate.

Aluminum Hydroxide. The clinical activity of this substance in peptic ulcer has been attributed to its acid-combining power, its demulcent and protective properties, its adsorbent action and its amphoteric quality. Chemical studies have shown that the first action is due to simple chemical neutralization with the formation of aluminum chloride and water. Direct evidence for a coating effect was obtained in dogs, but it is impossible to assess the significance of the demulcent and protective properties in clinical application. Adsorption studies show that aluminum hydroxide is less active than magnesium trisilicate, chalk, or kaolin; and, whether adsorption of toxins, gases, bacteria, histamine, or histamine-like substances in the gastrointestinal lumen is significant in the healing of peptic ulcer, is uncertain. The amphoteric qualities are an irrelevant consideration.

Other significant characteristics of aluminum hydroxide are: (1) the absence of effect upon acid-base relationships or aluminum content of the blood, and (2) interference with phosphate absorption and consequent increase in fecal

phosphate and decrease in urinary phosphate. This latter factor may be of importance in conditions predisposing to low phosphate intake or poor absorption.

Further noteworthy characteristics are: (1) absence of effect upon gastric secretion of motility; (2) possibility that aluminum may inactivate pepsin from gastric juice, a property which may account for a portion of its beneficial action in peptic ulcer; (3) interference with absorption of iron in the anemic rat but not in human subjects; and (4) constipating action of insoluble aluminum compounds formed in the intestine.

Kirsner and Palmer found that 16 ml. of aluminum hydroxide gel given hourly with 90 ml. of milk and cream will maintain an average intragastric pH of 2.2, and 30 ml. given hourly will maintain an average pH of 2.7 in the intubated ulcer patient. This has been construed as indicating that the beneficial effect of this substance upon the clinical healing of the peptic ulcer may be dependent in part on factors other than neutralization.

The practical disadvantages of aluminum hydroxide are the volumes required for adequate neutralization, relative high cost, and constipating action.

Magnesium Trisilicate. This substance reacts chemically as do the preceding ones. This reaction is characterized in vitro by a lag phase, 75-80% of the magnesium being used up in the first hour and the remainder in 3 to 4 hours. The adsorptive properties, significantly higher than kaolin, chalk, aluminum, or magnesium oxide, render it useful in the treatment of peptic ulcer, possibly because of the adsorption of pepsin, acid, toxins, bacteria, and gases. The in vivo and in vitro studies reveal that it is not a particularly effective neutralizing agent, although it conforms to many requirements of an acceptable antacid product. At the present time the main position of this agent is to counteract the constipating action of other more effective antacids, since it does have a strong laxation action.

Dihydroxyaluminumaminoacetate. This chemical was prepared in order to combine the acid-neutralizing ability of the amino acid glycine with that of aluminum. Clinical studies have reported the drug favorably and without significant side effects. Further controlled evaluation is required.

Mucin. On the theory that it provides a physiologic protective substance for the gastroduodenal mucosa, mucin was introduced for the treatment of peptic ulcer. Many reports of the beneficial effects of added mucin are in the literature while, at the same time, reports of a deficiency of mucus in the ulcer patient have not been substantiated. Other possible bases of therapeutic value lie in the acid-neutralizing and pepsin-inhibiting properties, although it should be pointed out that the capacity of both commercial and natural mucin is relatively small. Mucin is no longer in wide-scale use because of its unpalatability. Whether the newer mucin-antacid combinations will survive further clinical scrutiny remains to be seen.

Resins. The introduction of synthetic resins into ulcer therapy followed observations in 1935 that certain resins possessed the ability to take up acid

anions in acid medium and release them in an alkaline medium without themselves being altered. Due to the nature of an adsorptive process, the surface area of resin making contact with acid is important to the acid-combining capacity, explaining the large doses needed for favorable in vivo results. Using clinical improvement and x-ray healing as criteria, resins were found—along with dietary and anticholinergic therapy—to produce favorable results in the peptic ulcer patient. There is a striking lack of side effects, constipation is no problem, and the only complaint from the patient is the large volume required in addition to a sandy or powdery after-taste. Comprehensive appraisal is restricted by lack of sufficient clinical trials.

Sodium Carboxymethylcellulose. The outstanding advantage of this preparation is its freedom from side effects. It is considered to be highly palatable. However, its acid-neutralizing capacity is low and its clinical trials few. The possibility that it may be a useful adjuvant to other antacids by reason of its depressant effect on gastric emptying awaits further study.

NEUTRALIZING PROPERTIES OF PRINCIPAL ANTACIDS

In vitro neutralization is not necessarily an accurate index of the clinical effectiveness of antacid, but it is the best guide available for predicting the minimum effective clinical dose.

The aluminum preparations available to the patient have been shown to possess great variability with different lots of the same product showing significant inconsistency in acid-neutralizing capacity. Much less uncertainty is engendered by the data on calcium carbonate. The complexity of the problem is probably best illustrated by the data on dihydroxyaluminum aminoacetate. Seven tablet preparations are listed each containing 0.5 gm. and apparently identical in composition, but with neutralizing capacities varying from 55 to 85 ml. of HCl per tablet. The lower efficiency of tablet versus liquid preparations of the same antacid is also evident from data presented in tables.

Gastric emptying is the greatest single factor limiting antacid effectiveness. Consequently, a rapidly acting antacid is required and must be administered frequently. This is in direct contrast to many advertising claims which advocate slow acid neutralization as advantageous. The converse is true and rapidity of action is an essential consideration in antacid selection. Tables again graphically delineate the time of reactivity of the various preparations.

ECONOMIC CONSIDERATIONS

The prohibitive cost of prolonged antacid and antispasmodic medication represents a major difficulty in the successful management of peptic ulcer. Data not being obtainable as to exact requirements for physiological neutralization, certain assumptions must be made, with a resultant indication that

an eight-fold excess of antacid is required for effective therapy. On this basis, according to tables presented, the per diem cost of neutralizing the daytime output of HCl in the average duodenal ulcer patient could range from \$0.43 to \$43.36. The least expensive neutralizers are calcium carbonate preparations followed by aluminum hydroxide, with or without magnesium salts. Aluminum aminoacetate is the most expensive of the more popular groups, although liquid sodium carboxymethylcellulose is by far the most expensive of the entire series evaluated. (Brody, M., Bachrach, W.H., Antacids. I. Comparative Biochemical and Economic Considerations: Am. J. Digest. Dis., 4: 435-460, June 1959)

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Radiologic Screening for Gastric Carcinoma

The near perfection of surgical procedures in the treatment of carcinoma of the stomach has been extremely gratifying, but the survival rates are still discouragingly low. The present limitations of surgery emphasize the need for further effort to detect the disease at an earlier stage in its development.

It is evident that reliance on symptoms and signs in the early diagnosis of this stealthy process is often disappointing. The value of symptomatic detection of gastric cancer has been well demonstrated, particularly in association with pernicious anemia. The x-ray screening procedure has been the most important factor in achieving an early diagnosis during the asymptomatic phase.

In assessing the value of the screening procedure, the authors established the following criteria for selection for roentgen examination of the stomach: (1) achlorhydria or hypochlorhydria (histamine given unless contraindicated); (2) occult blood in stool; (3) strong family history of carcinoma of the stomach; (4) unexplained hemoglobin level below 11 gm.; (5) vague symptoms of gastric disease; and (6) inability to pass gastric suction tube.

From 1 March 1948 to 31 December 1954, a total of 6,968 patients were seen at the clinic of the study. Of this group, 3,210 were subjected to roentgen examination and comprised the cases of this study.

During the period of observation, 15 cases of gastric carcinoma were found with the median age of the patients being 63 years. Only 6 of these patients were completely asymptomatic. Of the 9 who were symptomatic, only one had symptoms for more than one year. The physical examination was negative in 13 patients. Laboratory results showed that 4 patients had hemoglobin values below 12 gm., none had free acid values above 30°, and in only 3 cases were the stools guaiac-positive. In 14 of the 15 cases of carcinoma found, the primary indication for roentgen examination was low

gastric acidity. In the remaining case, the gastric tube could not be passed initially. It is notable that the other indications for examination listed above were not productive of cases of carcinoma.

In all of the 15 cases a tumor was found on x-ray examination, with a specific diagnosis being made in 9 cases. There were 3 cases in which roentgen diagnosis led to surgery and no malignancy was found—one was found to have a completely normal stomach, one had antral gastritis, and the third had a combination of a benign polyp and antral gastritis.

The ratio of yield to effort was one case of cancer of the stomach found per 493 roentgen examinations, or one cancer found per 447 patient years of roentgen observation. The latter figure may be of more significance when it is seen that 6 cases were found during the first year of observation of 1,647 patients, for a yield of 3.7 per 1,000 patients, whereas those followed for longer periods showed a yield of only 1.8 per 1,000. This would tend to confirm the impression that the development of the average case of gastric carcinoma proceeds over a period longer than one year.

This series bears out the contention that the value of cancer detection by any survey method should be based upon the yield in the second and succeeding years. The yield per examination in the later years is smaller, but the percentage of salvageable cases is much greater.

In considering the applicability of this method of cancer detection to general medical practice, the considerable expense must be considered. The time involved with highly trained personnel is generally not of practical benefit on a nationwide scale. Employing the criteria of hypoacidity alone has been shown to detect only approximately 85% of the gastric cancers. It is assumed that the other 15% will be missed until symptoms develop. Other adverse factors of this procedure are present.

On the positive side, it is evident that the effort expended does yield a larger percentage of patients with the neoplastic process at an earlier stage. In addition, other lesions of the stomach and lesions extrinsic to the gastrointestinal tract may be discovered. And, since twice as many men as women were discovered in this series to have carcinoma of the stomach, the yield could be increased by limiting the examination to men.

The application of this method for mass surveys is presently impractical. It is questionable whether the yield would be sufficient to justify the extensive use of personnel. As a prophylactic procedure for individual patients in whom the indications are present, it may be of considerable value. Widely practiced, some increase in the salvage from gastric carcinoma would result. (J. R. Amberg, M.D., L. G. Rigler, M.D., CAPT E. N. Gipson MC USA, and CAPT A. R. Margulis MC USN, Gastroenterology, 36: 796-800, June 1959)

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Amniotic Fluid Embolism

Amniotic fluid embolism is a definite established entity and one of the most catastrophic situations encountered in obstetrics, having been described for the first time by Meyer in 1926. Prior to that time these deaths were placed in the category of obstetric shock, profound toxemia, idiopathic pulmonary edema, or postpartum hemorrhage. In a monumental publication in 1941, Steiner and Lushbaugh reported to have demonstrated particulate matter of the amniotic fluid (meconium, squamous epithelial cells, and vernix caseosa) in the smaller arteries, arterioles, and capillaries of the lungs of these patients. They also reproduced the syndrome experimentally in dogs and rabbits. Subsequent case reports have appeared in the literature substantiating their concept.

The predisposing factors are considered to be uterine tetany or exceptionally strong uterine contractions, meconium in the amniotic fluid, intrauterine death, excessive fetal size, advancing age of the mother, and multiparity. In the presence of suddenly developed restlessness, dyspnea, cyanosis, and profound shock, Steiner and Lushbaugh consider that the clinical diagnosis is possible before death.

Judging from the case reports contained in literature it is postulated that excessively powerful contractions prepare a route for the entrance of the emboli into the maternal uterine sinuses by loosening or tearing the placenta and membranes and then forcing the emboli into these channels. The one common denominator of all cases seems to be a tumultuous labor or exceptionally strong uterine contractions and, significantly, a large percentage have had pituitary extract during labor. The careless use of this drug, therefore, must be implicated in the etiology of this catastrophe. Further analysis shows the rupture of membranes prior to the onset of the symptoms in the majority of cases. Following rupture of the membranes it is conceivable that the amniotic fluid may dissect between the membranes and the uterine wall and enter the venous sinusoids. In cases of rupture of the uterus, cesarean section, premature separation of the placenta, and placenta previa, the amniotic fluid has easy access directly into the maternal circulation.

Incident to death in the cases of amniotic fluid embolism, post partum hemorrhage is a frequent occurrence. Hemmings and others were among the first to make observations which established that, during life, the circulating blood may become incoagulable as a result of amniotic fluid embolism. Still other reports indicate that afibrinogenemia develops during this condition, or that amniotic fluid contains a thromboplastin-like substance. It has been established that the placenta and decidua are rich in thromboplastin. Although it is clear that some patients develop incoagulability of the blood, the mechanism remains obscure. These patients may also present decrease in platelets, prothrombin, and accelerator factors with increase in fibrinolysins. One observer believed that the clotting defect in

amniotic fluid embolism was due to a heparin-like material in the circulating blood.

The cause of the patient's death remains another unknown aspect of the disease. The symptomatology of the process seems fairly uniform throughout the cases in the literature. The patient may have a chill or feel cold, then become restless or apprehensive, dyspneic or cyanotic, or profound shock may appear. Unlike venous thrombotic embolism, pain in the chest is a rare complaint. Pulmonary edema may be present. In cases where the embolism is massive to the pulmonary vascular tree, there is mechanical blockage with subsequent acute pulmonary hypertension (cor pulmonale) and acute dilatation of the right heart. Steiner and Lushbaugh are of the opinion that the mechanism is predominantly one of anaphylactoid shock combined with the mechanical blockage. They suggest that death might be due to nervous reflexes initiated in the lung by the emboli causing cardiac depression and pulmonary vascular spasm. Reflex bronchospasm is probably also present. In cases complicated by hypofibrinogenemia or afibrinogenemia, hemorrhagic shock is an added insult.

Although a few presumptive sublethal cases of amniotic fluid embolism with recovery have been reported in the literature, the disease is almost always fatal. To establish an indisputable diagnosis it is necessary to demonstrate amniotic particulate matter in the pulmonary vessels and this is not possible except at autopsy. The entity is so infrequent that the physician is not constantly alert to its possibility. Rapid action is necessary if there is to be any hope of saving the patient. Oxygen therapy is indicated. Morphine is the best drug for the characteristic restlessness and apprehension and should be given even in the presence of cyanosis and shock. Intravenous injections of papaverine and atropine are indicated to block vagal effects and relieve spasm of the blood vessels and bronchial tree. Aminophylline may be used in this regard, although epinephrine is probably contraindicated because of its constrictive effect on arterioles already partially constricted. The withholding of intravenous fluids and blood in the presence of acute pulmonary edema is mandatory, and tourniquets to the limbs or phlebotomy might produce additional therapeutic results so urgently desired in this emergency.

In cases of incoagulability of the blood, fibrinogen and fresh whole blood are indicated. The amount of fibrinogen required should be equivalent to that contained in the circulating blood (8-12 gm.) because complete defibrination is possible. A minimum of 4 gm. is necessary, but possibly three times that amount might be required before normal clotting and hemostasis are restored.

As a part of the study of the clinical entity, the authors reviewed data obtained from the Minnesota Maternal Mortality Study. During the first seven years of this study there were 370 maternal deaths among nearly 560,000 live births. Amniotic fluid embolism was ranked as the fifth category

with regard to frequency as a cause of obstetrical deaths, there being 15 deaths—an incidence of one per 37,323 live births. There were undoubtedly sublethal cases, as reported in the literature, but these are always questioned since the true diagnosis is made only at autopsy. (Barno, A., Freeman, D. W., Amniotic Fluid Embolism: Am. J. Obst. & Gynec., 77: 1199-1210, June 1959)

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Poliomyelitis Vaccination Schedule

Surgeon General Leroy E. Burney of the Public Health Service made public the findings of a committee of advisors who were asked to review the experience to date with Salk poliomyelitis vaccine and to make recommendations for vaccination based on present knowledge and experience.

The review shows that groups vaccinated with the recommended series of three doses of vaccine have maintained a high degree of protection against poliomyelitis. This vaccine has been available to the public since 1955 and groups vaccinated over three years ago still maintain considerable protection against the disease.

Surveillance studies of cases of poliomyelitis that occurred in 1958 indicate that the probability of contracting paralytic polio has been reduced on the average of 75% for individuals who have received the basic series of three injections of vaccine as compared with non-vaccinated individuals. For some groups of children, the probability of contracting paralytic polio has been reduced in the vicinity of 90% for those who received the full basic course of three doses of polio vaccine as compared to non-vaccinated children of the same age. Cases of paralytic polio have occurred in persons who have received the basic course of injections of vaccine. However, the great majority of paralytic polio cases occurring in 1958 were among unvaccinated persons.

In the light of present knowledge and experience, the Surgeon General's committee of advisors presented the following recommendations for polio vaccination:

1. Completion of the basic series of three injections of Salk type polio vaccine is recommended for all persons under 40 years of age who have not been vaccinated or who have received fewer than three doses of vaccine. Vaccination of persons age 40 and over can also be beneficial; however, it is less urgent since polio occurs less frequently in older individuals. The recommended basic schedule for all persons, except young infants, is three doses of 1 ml. each as follows: (1) an initial injection, (2) a second injection 4 to 6 weeks after the first, (3) a third injection 7 to 12 months after the second dose.

2. A basic schedule of four injections is recommended for infants less than 6 months of age consisting of a series of three injections of 1 ml. each of polio vaccine, spaced one month apart beginning before 6 months of age and as early as 2 months of age, followed by a fourth injection 7 to 12 months after the third dose. Polio vaccine for infants and young children may be given as separate injections or in quadruple vaccines which combine polio vaccine with diphtheria, pertussis, and tetanus vaccine. The schedule recommended by the manufacturer of such quadruple vaccines can be followed when this product is used. Infants under 6 months of age do not always develop an adequate antibody response from two initial injections so that the third primary injection appears desirable. Vaccination early in infancy is recommended. However, complete information on optimum dosage schedules will require further experience with the separate and quadruple vaccines.

3. It is recommended that a booster dose of 1 ml. of poliomyelitis vaccine be given to persons under 40 years of age who have completed the basic series of three doses at least one year previously and, especially if several years have elapsed since completion of the basic series of injections. Such a booster dose is expected to increase antibody titers in persons in whom the antibody levels have fallen or in whom the initial antibody response was weak, thereby providing possible added protection against poliomyelitis.

4. A booster dose of 1 ml. of polio vaccine for vaccinated persons is especially indicated when individuals may be entering situations or traveling into areas where the incidence of polio is high:

- a. When local epidemics of polio are beginning, an emergency booster dose may be given as early as one month following the previous dose of vaccine regardless of the number of previous doses.
- b. When preschool children are to enter school.
- c. Pregnant women prior to the polio season because the vaccine not only provides added protection against poliomyelitis for the mother but also provides a passive immunity to the unborn baby.
- d. Persons traveling into areas where sanitation may be poor or polio is known to be present.

These recommendations were drawn up with the advice of the following individuals:

COL Donald M. Alderson USAF (MC), Assistant for Professional Services, Office of the Assistant Secretary of Defense (Health and Medical); Dr. Gordon Brown, Professor of Epidemiology, University of Michigan School of Public Health; LTCOL Joseph W. Cooch, Chief, Communicable Disease Branch, Department of the Army; Dr. Edward C. Curnen, Chairman, Committee on the Control of Infectious Diseases, American Academy of Pediatrics; Dr. Geoffrey Edsall, Chairman, Committee on Immunization

of the Armed Forces Epidemiology Board, Walter Reed Hospital; Dr. Hollis S. Ingraham, First Deputy Commissioner, New York State Health Department; Dr. Cyrus Maxwell, Washington Medical Liaison, American Medical Association; Dr. Andrew C. Offutt, Indiana Health Commissioner; Dr. James C. Overall, President of the American Academy of Pediatrics; Dr. Julian P. Price, Chairman of the Poliomyelitis Committee of the American Medical Association; Dr. Thomas M. Rivers, Vice President-Medical Affairs, The National Foundation; Dr. Jonas Salk, Professor of Experimental Medicine and Director of Virus Research Laboratory, School of Medicine, University of Pittsburgh; and a number of officials from the Public Health Service. (Bulletin on Poliomyelitis Vaccine released by Surgeon General Leroy E. Burney of the Public Health Service, 28 June 1959)

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Admiral Hopwood's Address to Graduating Interns

Rear Admiral Bartholomew W. Hogan, the Surgeon General of the Navy, feels that all Medical Department personnel will be interested in the address which was given by Admiral Herbert G. Hopwood USN, Commander in Chief, U.S. Pacific Fleet, before the graduating class of interns at the U.S. Naval Hospital, Oakland, Calif., 29 June 1959. Following are some extracts from that address:

" Today marks the point in your lives when you truly assume the duties, responsibilities, and privileges of the Naval Medical officer. I know that some of you will pursue further training, but you are going as full-fledged physicians, totally assuming the heavy burden which the title of Doctor brings with it

A moment ago, I referred to you as Naval Medical officers. I chose this term deliberately for that title carries with it the traditions of two noble professions, the Doctor and the Naval officer. I need not remind you of the great respect held for the doctor by our society. He has become the source of physical well-being and mental guidance for the nation. . . . The Naval officer too has become a symbol in our society. He represents dedication to duty in both peace and war. He has the reputation of being able to do the job in spite of adversity. He is a leader and a doer . . . The Naval Medical officer assumes the traditions of both professions when he puts on the insignia of his rank and the device of his Corps.

Perhaps, in a graduation address, you find such reference to tradition a little surprising. Tradition speaks from the past, your challenge is the future . . . 'To the military, correct understanding of tradition is of

especial importance, for if wisely used it is inspirational—if blindly adhered to, it can be both shackle and dry rot. ' (Admiral Robert Carney)

We must reflect upon the past—there we can find the principles which guided our predecessors to their successes . . . John Paul Jones found most of his guns out of action . . . but still he declared that he had not yet begun to fight . . . Doctor Lewis Heerman, Surgeon of the Frigate Enterprise, successfully captained the sloop which carried Decatur's men to victory against the Bey of Tunis . . . Farragut defied the torpedoes in salty terms . . . I honestly feel that an ordinary man can become great by living up to the traditions of his service.

The application of these principles led Naval Medical officers in the Barrios of the Philippines . . . Other Medical officers have fought tropical disease while their fellows have made preventive medicine a true science

Tradition must be part of our professional attitude. It is the spice in your day-to-day work—it is the challenge to accomplish the difficult and conquer the impossible.

Today we are nominally at peace . . . but the needs of the free world dictate that the Fleet be deployed in every corner of the world . . . Many of you will soon join that Fleet, and you will join the ships in their task of 'Showing the Flag' . . . You will have to separate yourselves from your loved ones . . . It will help everyone gathered here to recall, when loneliness comes, that the Medical officer is performing a national service in the finest tradition of the Navy and his Corps.

Aboard ship your life will be governed by the orderly pattern of a seaman's life. You will encounter customs and traditions which seem almost rooted in obscurity. But most of them began as safety or health regulations . . . The health of the ship's company has great effect upon morale, performance, and discipline . . . The Medical officer with his close relationship to sick or unhappy men has a good opportunity to be a leader. The doctor can, by example, display the fundamental principles of honesty, integrity, reliability, loyalty, fair play, and patriotism . . . This is the type of leadership required in a military organization made up of free people . . . (The Medical officer) has the example of tradition to inspire and assist him.

Those of you who will not join the Fleet immediately have a valuable service to perform in other areas . . . You have an additional obligation . . . which I consider to be of the greatest importance—the care of dependents. Ours is a married Navy . . . The men aboard the ship firmly believe that the phrase 'The Navy takes care of its own' applies to these, their loved ones. I agree . . . These people will occasionally place a great burden upon you, but you must remember to give each one the same care you would want for your own family . . . You can in this way have great influence upon the effectiveness of the operating units of the Fleet.

Without effort and sacrifice by (you) parents, wives, brothers, and sisters, many of these young men would not be here today. Your efforts will be rewarded by their accomplishments . . . You have given the Navy a great gift, but in return you become part of the greater Navy community. . . . In such a way you become part of the tradition too . . . You now have a deep personal identification with national security and world peace through sea power.

And you young men . . . I have reviewed for you the hard demands of tradition. I am confident that you will prove equal to the challenge and that both you and the Navy will benefit by your association during the years . . . I welcome you to your new role. . . . "

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Release of New Film Series

Prints of a new series of five related films with the general title, "Shipboard Inspection by Medical Department Personnel," are now being distributed. These motion pictures were produced for the instruction of Medical Department personnel at sea and for such specialized programs as those of the Environmental Sanitation School and the several Preventive Medicine Units. Many principles set forth make them adaptable to other programs concerned with training in sanitation.

The films, in black and white, are:

"Water Supply" (MN-8238a, 21 min.) shows how and where to inspect a ship's fresh-water supply system at the points of possible contamination. It demonstrates accepted procedure for chlorination and presents a graphic explanation of cross-connection.

"Living and Working Spaces" (MN-8238b, 20 min.) shows what to inspect to insure good conditions of sanitation, ventilation, lighting, and safety in a ship's living and working spaces, exclusive of the galley and associated areas, making a point of the need for tact and judgment on the part of Medical Department personnel.

"Food Storage" (MN-8238c, 12 min.) shows the points of a sanitary inspection of the food storage aboard ship—cleanliness, air circulation, temperature, and methods of stowage.

"Food Preparation" (MN-8238d, 25 min.) shows how, where, and when to look in making a sanitary inspection of the equipment, spaces, personnel, and work habits involved in the preparation of food.

"Food Serving" (MN-8238e, 13 min.) shows inspection of messing areas, serving line, and scullery, and is organized around the same principal points as those in "Food Preparation."

Prints of these films are being distributed to Naval Training Hospitals, Hospital Corps Schools, the Environmental Sanitation School, Preventive

Medicine Units, and to District Training Aids Sections and Libraries. If prints are not available through usual sources, address inquiry to the Film Distribution Unit, Training Division, Bureau of Naval Personnel, Department of the Navy, Washington 25, D. C.

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Orthopedic Seminar

The first annual Armed Forces Orthopedic Seminar, sponsored by the U. S. Navy, will be held at the U. S. Naval Hospital, Oakland, Calif., September 23, 24, and 25, 1959. The program includes a symposium on knee injuries and discussion by Dr. Don O'Donaghue of Oklahoma City. Dr's. Harold A. Sofield, Joseph S. Barr, and Frank E. Stinchfield will be present as guest speakers.

All Orthopedic Surgeons and Orthopedic Residents on active duty in the Armed Services and members of the Northern Chapter of the Western Orthopedic Association are invited to attend. Reserve attendance will be announced in appropriate Reserve publications. Naval Medical officers who desire to attend the Seminar should submit a written request via their commanding officer to arrive in the Bureau of Medicine and Surgery by 14 August 1959. Requests should be submitted in compliance with BuMed Instruction 1520.8 and guidelines for selecting officers to attend will be as outlined in paragraph 5 of this instruction. Officers selected by the Bureau's Advisory Board will be approved for temporary additional duty travel and per diem orders.

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BUMED INSTRUCTION 6320.5G SUP-1

1 July 1959

From: Chief, Bureau of Medicine and Surgery
To: Naval Hospitals and Medical Centers

Subj: Open-heart surgery utilizing extracorporeal circulation

In view of the expense of open-heart surgery in civilian institutions, the need for training Naval Medical officers in the field, and the desirability of keeping the Naval Medical Corps abreast of advances in medicine, centers for the performance of this type of surgery have been established. This instruction designates the centers and contains instructions for the transfer of suitable candidates for this surgery to the appropriate center.

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DENTAL**SECTION**Current Trends in Antibiotics in Oral Surgery

If antibiotic therapy is indicated, it should be undertaken vigorously to avoid a therapeutic failure. Possible causes of failures of the antibiotics to correct or prevent an infection include:

1. The use of antibiotics as substitutes for surgery, particularly incision and drainage procedures.
2. The causative organism not being sensitive to the antibiotic employed.
3. Presence of emerging strains of bacteria resistant to the antibiotic.
4. Alteration of the bacterial flora during treatment (super-infection).
5. Inaccessibility of the lesion so that the therapeutic agent cannot be brought into contact with it. Chronic oral infection, bony sequestra, and infections surrounded by a protective membrane are examples of this difficulty.
6. Inadequate dosage. In certain situations, low doses may actually stimulate the growth of bacteria; inadequate dosages may merely arrest the growth of the bacteria, whereas the indicated blood level of antibiotics would be bactericidal.
7. Too early withdrawal of therapy.
8. Failure to supplement antibiotic therapy with general supportive care.
9. The lesion having an etiology that is other than bacterial.

Conclusions

1. Antibiotics are liberally administered to patients by all the disciplines of the healing arts and from proprietary sources. In view of the quantity administered, they are relatively safe drugs.
2. There are severe, life-threatening reactions possible following the use of antibiotics, and the question of the potential benefit to the patient versus the risk that he will face must be constantly weighed.
3. It is evident that antibiotics have not modified sound surgical principles. Due to the emerging resistant strains of bacteria, however, this era of antibiotics calls for a reinforcing of sound surgical practices.
4. Antibiotics have allowed a greater latitude in the surgical procedures that may be performed, and they have greatly reduced morbidity following surgery.

(LTCOL C. C. Alling DC USA, COL E. J. Pulaska MC USA, Current Trends in Antibiotics in Oral Surgery: Oral Surg., Vol. 12, June 1959)

Curriculum for Navy Reserve Dental Companies

A curriculum for the Navy Reserve Dental Companies based on Chapter Six, Manual of the Medical Department, and the U. S. Naval Dental Clinic Administration (NavPers 10789), is being distributed to Naval Reserve Dental Companies, District Dental Officers, and Naval Reserve Training Commands.

The material covered in the text may be presented as a discussion or lecture. The outlines are complete and easy to follow and yet flexible enough to allow the lecturer to develop his presentation in his own way.

The curriculum should be readily adaptable to the facilities and personnel of the individual companies and is not intended to supplant existing training programs.

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Dental Officer Serves on Civil Defense Committee

CAPT Arthur R. Frechette DC USN, Deputy Chief of the Dental Division, Bureau of Medicine and Surgery, was elected to serve on the Standing Committee on Civil Defense of the American Association of Dental Schools. CAPT Frechette's term on the Committee will expire in 1964.

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Designation of Inspector General

CAPT Robert S. Snyder, Jr., DC USN assumed the duties as Inspector General, Dental, in the Bureau of Medicine and Surgery on 16 June 1959. CAPT Snyder was formerly Head of the Planning and Analysis Branch in the Dental Division.

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Personnel Assignments in Dental Division

CAPT Mack L. Parker DC USN relieved CAPT Robert D. Wyckoff DC USN, Head, Standards and Training Section, Dental Division, Bureau of Medicine and Surgery. Prior to his present assignment, CAPT Parker was the Head, Enlisted Education and Training Department, U. S. Naval Dental School, National Naval Medical Center, Bethesda, Md. CAPT Wyckoff will assume the duties of the Commanding Officer, U. S. Naval Dental Clinic, Yokosuka, Japan.

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RESERVE SECTION

Active Duty for Training Fiscal Year 1960

The courses listed below are a continuation of active duty for training authorized for Fiscal Year 1960 and published in the preceding issue of the Medical News Letter, dated 3 July 1959. Eligible Naval Reservists should communicate with the commandant of their naval district concerning assignment to these courses.

ON THE JOB TRAINING IN SUBMARINE MEDICINE

Place: U.S. Naval Medical Research Laboratory, U.S. Naval Submarine Base, New London, Conn.

Date: 3 August 1959

1 February 1960

2 November 1959

2 May 1960

On-the-job training presenting an up-to-date review of problems relating to submarine medicine, including recent developments in submarine medicine research.

Eligibility Requirements. Naval Reserve Medical and Medical Service Corps, male officer personnel only. Quotas have been authorized for 1st, 3rd, 4th, 5th, 6th, 8th, and 9th Naval Districts.

ON THE JOB TRAINING

Place: Any suitable training medical facility.

Date: Convening date to be arranged between the commandant, trainee, and CO of training facility.

On-the-job training in Naval Medical Department organization and operations. These billets may be utilized in providing officer instructors of Naval Reserve hospital corpsmen performing active duty for training.

Eligibility Requirements. Naval Reserve Medical Department officer personnel, male and female, with previous active duty training. Quotas have been authorized for all continental naval districts.

MEDICAL DEPARTMENT ORIENTATION

Place: Any naval hospital.

Date: Convening date to be arranged between the commandant, trainee, and CO of the naval hospital.

Two weeks' on-the-job training available to any Medical Department Reservist who has had no previous active duty or active duty for training.

This training is intended to indoctrinate the Naval Reservist into the operation and function of the Medical Department and the entire Navy.

Eligibility Requirements. Naval Reserve Medical Department personnel, male and female. Quotas have been authorized for all continental naval districts.

FIELD MEDICINE

Place: Camp Joseph Pendleton, Oceanside, Calif.

Date: 9 August 1959 and 11 October 1959

Lectures, demonstrations, and practical exercises to familiarize Reserve Medical personnel with problems usually confronted, and techniques to be employed in the application of field medicine. One week is devoted to classroom work and one week to field work.

Eligibility Requirements. Naval Reserve male Medical Department personnel including enlisted hospital corpsmen. Quotas have been authorized for 11th, 12th, and 13th Naval Districts.

HOSPITAL CORPS TRAINING

Place: Any suitable Naval Medical Facility as may be determined by the cognizant commandant preferably a naval hospital.

Academic and on-the-job training, individual and group, with a view to qualifying the trainee for advancement in rating and the performance of commensurate duties in the event of mobilization. Practical factors required by the trainees for advancement in rating are emphasized.

Eligibility Requirements. Naval Reserve personnel in training for or change in rating to Group X. Personnel must have completed their initial recruit training in accordance with current instructions. Quotas have been authorized for all continental naval districts.

HOSPITAL CORPS CLASS "A" SCHOOLS

(14 days active duty for training)

Place: Naval Hospital, Great Lakes, Ill.

Naval Hospital, San Diego, Calif.

Date: Weekly beginning on Monday morning.

Instruction in subjects needed to provide the basic technical knowledge of skills required to prepare personnel for the lower petty officer rates.

Eligibility Requirements. Pay grades E-2 and E-3 are eligible for this training. Quotas have been authorized for all continental naval districts.

The following courses are not sponsored by the Bureau of Medicine and Surgery. However, Medical Department personnel are eligible to participate. Detailed information and reporting instructions are promulgated in BuPers Instruction 1571.4E. Copies of this instruction are available at all naval district headquarters and Naval Reserve training facilities.

NAVAL SCHOOL OF NAVAL JUSTICE

Place: Newport, R.I.

RESEARCH RESERVE SEMINAR IN RESEARCH METHODS

Place: Columbus, Ohio

Date: 12 - 25 July 1959

Place: San Francisco, Calif.

Date: 17 - 28 August 1959

RESEARCH RESERVE LIFE SCIENCES SEMINAR

Place: Brookhaven National Laboratory, Upton, N. Y.

Date: 13 - 26 September 1959

RESEARCH RESERVE SEMINAR IN SUBMARINE AND DIVING MEDICINE

Place: Naval Medical Research Laboratory, New London, Conn.

Date: 20 March - 2 April 1960

SHIP ACTIVATION

(Reserve Fleet)

NATIONAL RESOURCES CONFERENCES

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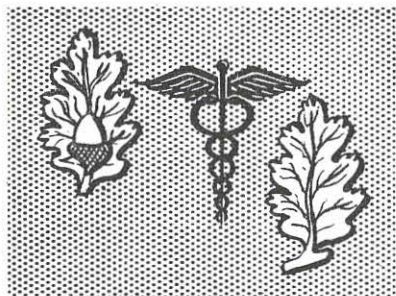
Annual Convention of American
Pharmaceutical Association

The American Pharmaceutical Association will hold their annual convention at the Netherland Hilton Hotel, Cincinnati, Ohio. The Section on Military Pharmacy will convene 17 - 21 August 1959.

Attendance at these sessions affords an excellent opportunity for inactive Reserve Medical Department officers to be brought up to date on the latest developments in Military Pharmacy.

The Chief of Naval Personnel has authorized one retirement point credit for each day's attendance of at least two hours' duration to eligible inactive Naval Reserve Medical Department officers, provided they register their attendance with the military representative present.

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Occupational Medicine

Pioneer Practitioner of Industrial Medicine Doubly Honored

Alice Hamilton, M.D., a founder of the profession of occupational medicine, was honored on her 90th birthday (February 27, 1959) by the establishment of a fund bearing her name at the Harvard School of Public Health.

John C. Snyder, M.D., Dean of the Harvard School of Public Health, said the Alice Hamilton Fund for Occupational Medicine was made possible by contributions from friends, admirers, former colleagues, and students of Dr. Hamilton in observance of his 90th birthday. "In response to this spontaneous and generous gesture, the Faculty of Public Health is proud to create a named Fund for purposes in keeping with Dr. Hamilton's lifelong interests and high achievement in the field of occupational medicine. These purposes will include scholarship aid and honoraria for lecturers. The School hopes eventually to establish an endowed Chair in Occupational Medicine."

In the early days of the twentieth century, Dr. Hamilton—then associated with Jane Addams at the Hull House in Chicago, with determination and persistence brought home the facts on industrial poisons to manufacturers, first in Illinois and later in the Nation. It was largely through her efforts that Illinois became the first State in the Union to adopt legislation in the field of industrial health. Nationally, she was instrumental in bringing about legislation resulting in the elimination of phosphorus from matches, the reduction of lead poisoning in metallurgy, and reduction of the poisoning caused by mercury, benzol, TNT, carbon disulfide, and carbon monoxide.

In 1910, when the State of Illinois started the first comprehensive survey of occupational disease, Dr. Hamilton became the survey's director. She continued in her work at Hull House until 1919 when she joined the Faculty of Medicine at Harvard as assistant professor of industrial medicine.

In retirement, she also conducted two surveys for the Federal Government, the first in 1937 into the health hazards of the rayon industry; the second in 1940 into diseases such as silicosis, common to miners. She is the holder of many honorary degrees.

The American Medical Women's Association of Boston honored Dr. Hamilton in 1956 by naming her Medical Woman of the Year. (Doubly Honored: Indust. Med., 28: 225, May 1959)

NOTE: A previous article, "Alice Hamilton, M.D.", honoring this great American woman appeared in the Medical News Letter, Vol. 33, No. 5, dated 6 March 1959.

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Industrial Ventilation

Clean air is necessary for the health and comfort of those who occupy any enclosed space. Open windows may provide adequate ventilation for some occupied spaces while others may need elaborate exhaust systems to remove contaminants from the workroom air. Ventilation also includes control of heat and humidity.

Air pollution has become a problem for industrial areas as well as for individual plants. In some regions, gases, dusts, and combustion by-products must be treated to make them safe and unobjectionable before venting to the outside, particularly in congested areas and where the topography does not permit the quick dissipation of contaminated air.

Principles of Ventilation

Ventilation systems are based on the following general principles, alone or in combination:

1. Plenum ventilation. Air is driven into the room by fans, diluting the room air with fresh air, forcing out stale air through doors, windows, and cracks. This method is limited to buildings where contaminants are non-toxic and limited in quantity.
2. Exhaust (vacuum) systems. Air is drawn from a room by fans and is replaced by air entering through doors, windows, and other openings.

General Ventilation

Where processes are not injurious to health, general ventilation is usually satisfactory. It is also satisfactory where dilution of air contaminants will keep the concentration below permissible limits for continuous exposure. Standards for many contaminants have been compiled by the American Standards Association.

Where contaminants are toxic, removal at their source is necessary, exhausting the impure air being usually practicable. However, in cold weather, it may be difficult and expensive to maintain a comfortable temperature due to the large volume of incoming air. Fans and blowers, both portable and stationary types, are useful for increasing circulation of air

which affords relief from heat, but they are not substitutes for exhaust ventilation where air contaminants must be removed. Blowing is more efficient than suction for moving large volumes of air. As temperature and humidity rise, devices for air circulation become less effective.

Caution should be used in air movement, particularly with velocity over 200 feet per minute. When relatively cool air is blown over workers at high velocity, objectionable drafts are created.

Control Measures

Where there is a definite source of air contamination, general ventilation alone is seldom an adequate control measure. Contamination control consists of:

1. Identifying the substance and locating its source
2. Atmospheric sampling to determine nature and extent of contamination
3. Engineering control measures

Control at the source may involve isolation or enclosure of the hazardous operation, local exhaust ventilation, and/or operational changes (substitution of process or materials).

Local Exhaust Systems

The local exhaust system is important in the control of occupational disease. It creates a sufficient movement of air to withdraw contaminants at point of origin and convey them to a safe point for disposal. A hood or enclosure near source of contaminant, piping to connect hood into the system, collection equipment, and a fan are the major parts of an exhaust system.

Dust is usually more difficult to control than gases, vapors, mists, and fumes. Dusty operations tend to project particles so that the hood must provide velocities sufficient to draw them into the exhaust system.

The exhaust hood, the most important part of the system, should enclose the process or be located to take advantage of the directional effects of the dust flow. Air velocity for effective control varies with the process and material exhausted.

Ducts connect the hood to the central fan, distribute the air flow in direct proportion to the requirements of each inlet, and maintain adequate pipe velocity to convey the contaminant to the point of discharge. Material used for ducts must resist abrasive action of dust or corrosive effects of gases and vapors.

Fans should have a capacity slightly higher than calculated requirements to allow for leakage in the system, accumulation of material on fan blades, and similar difficulties.

Portable ventilators are used for supplying fresh air during temporary work in confined spaces, such as tanks, tank cars, vats, underground cable

manholes, pipe galleries, ship holds, and airplane wing compartments and fuselages.

Disposal of Contaminants

Collecting and disposing of air contaminants are equally important. Gases, vapors, and mists may often be discharged to the outside atmosphere at a point where they will not recirculate around the premises in harmful concentrations. Dusts—both harmful and nuisance—require the use of dust collectors in the system. Where only nuisance dusts are involved, recirculation of the air after cleaning is often permissible.

Dust Collectors

Electrostatic precipitation which offers low resistance to airflow is highly efficient, particularly for fine dusts that are difficult to remove by other methods. The first cost and the maintenance cost are relatively high. Portable units are helpful in removing dust and smoke from small rooms.

Precipitators are less effective in collecting large particles moving with considerable force, and precleaners generally are required for high concentrations of dust. When the process requires a practically dust-free atmosphere, the precipitators are valuable.

A combination of viscous filter and electrostatic precipitation with a self-cleaning feature is used on some models of dust collectors. This solves the problem of dust capacity and of heavy particles.

Wet collectors use several devices for obtaining contact of water with the exhausted air so that dust particles form a sludge. One type consists of sprays or water curtains through which dust-laden air is drawn. These are efficient collectors for many types of dust. An important application is in the prevention of dust explosions from grinding aluminum or magnesium.

General Measures

Personal protective equipment is needed where exposure is occasional or where complete protection is not practicable. Removal of the hazard at its source should remain the objective. Supervision and training of employees, particularly in hazardous operations, are important.

Sanitation and maintenance must receive constant attention to keep equipment at top effectiveness and prevent development of unhygienic conditions.

Medical control is an important check on other methods. Engineering control is sometimes inadequate and symptoms of absorption of toxic materials by a worker may be the first real warning. Workers exposed to toxic substances should have frequent physical examinations. (Industrial Ventilation - Providing Clean Air for the Workplace: National Safety News, 79: 60-75, March 1959)

* * * * *

Hygiene of Welding in U. S. Naval Shipyards

Welding and burning in naval shipyards is big business. There are over 6,000 mechanics engaged in welding and burning operations in connection with the construction and repair of ships in naval shipyards. These 6,000 expose another 60,000 employees to the fumes and gases associated with welding and burning. One who has only seen welding and burning done on a shop bench by one mechanic working under favorable conditions cannot fully appreciate the complex problem of protection necessary when the work is performed several decks below with no ports to the outside. Until one has crawled through several bays of a double bottom only 18 inches high to get to a welder, he does not appreciate how confined "confined welding" can be.

Welding

Welding processes proved their potentialities so forcibly during the World War II era that they became standard and riveting became substandard. The convenience and flexibility of these processes lend themselves ideally for the fabrication, repair, and alteration of naval vessels. There are approximately 37 different welding processes in use. The commoner methods employed in shipyards include arc welding with use of a shield of coating or inert gas; gas welding with use of oxyacetylene; resistance welding; and brazing.

The degree of atmospheric fume contamination is dependent on the composition of the materials being heated; to this is added the oxidation products of the coatings on the parts being united or separated. These contaminants increase when the inert-gas metal-arc welding and cutting processes are used. Inert-gas shielding around the arc doubles the intensity of ultraviolet radiation and the intensity increases with higher current densities. The ultimate found was 5 to 30 times more ultraviolet radiation and one and one-half times more infrared radiation. In addition, it was found that ozone, oxides of nitrogen, and metal-fume generation were greater than with shielded rods and, also, that argon was a more serious offender than helium.

Greater personal protection has been necessary to cope with the increases in contaminants and radiations. Clear glass does not give the degree of protection afforded other types of welding. An investigation revealed that a welder developed actinic-ray ophthalmia even though safety goggles had been worn. Some welders turned to tinted-lens safety goggles for use under their helmets and increased the face-shield lens from No. 10 tint to No. 14 tint. To remove the oxidation products from the breathing area of an operator of an automatic inert-gas welding unit, a perforated tube was secured to the upper bracket of the machine and by passing compressed air through the perforations the oxidation products became entrained and dispersed. A Bureau of Ships' investigation further revealed that the intensity at 2 feet from the argon-shielded arc with consumable electrode has been found to be high

enough to produce a reddening of the skin in a few seconds and a severe skin burn in a few minutes. Clothing, especially cotton goods, deteriorated so rapidly that further caution was necessary in examining clothing for radiation leaks that might cause skin burns.

In spite of the foregoing, the inert-gas process has proved so successful for the welding of aluminum that it is the method of choice.

Aircomatic Welding of Manganese Bronze Propellers. Flaws in manganese bronze propeller wheels are chipped out and wire of the same composition is welded into the crevice and later ground to a smooth surface. These propeller wheels contain no lead, but they do contain up to 15% zinc; consequently, considerable fume is given off in the welding operation. An 18 by 18-inch square hood tapering to a 6-inch round collar was connected through a 1000 cfm (cubic feet per minute) blower exhausting outside the building; when this hood was positioned 18 inches above the weld location, over 90% of the fume was removed.

Galvanized Metal Welding. In ship construction a fair amount of welding and burning is done on galvanized iron. Fresh water tanks and much of the piping running through tanks are galvanized.

The utilization of rigid industrial hygiene principles by the Industrial Hygienists successfully reduced the number of cases of metal-fume fever at naval shipyards. What was once a common occurrence has now become a rarity. From October 1956 to September 1957, four cases of metal-fume fever from welding or burning were reported at the Boston Naval Shipyard, and from October 1957 to September 1958, only one case was reported.

Burning

A cutting or burning process usually does not produce as high gas concentration as welding, but fume concentrations are significantly greater.

A simple but effective installation for controlling the oxidation products at a manganese steel burning table was devised by enclosing the bottom of the table on three sides and exhausting 1500 cfm through duct-work to the outside. The open face was 3 x 5 feet. The face velocity produced was sufficient to control the oxidation products.

Lead Burning. Lead burning has not been too common in shipyards, but its popularity is increasing with the advent of nuclear-powered ships. The lead-in-air concentrations are low because the temperature needed is only slightly above melting point. One study was made of this operation and less than 0.01 milligrams (mg.) per cubic meter was found. The burner's urinary lead was 0.02 mg. per liter and his coproporphyrin level was normal.

Urinalyses for lead have been done quarterly on 10 naval inspectors employed at a contract yard building an atomic cruiser where they are occasionally exposed to lead-burning operations. The urinary lead levels have ranged from 0.02 to 0.08 mg. per liter and all coproporphyrin determinations have been normal.

Welding and Burning on Paints or Coatings

A study was made over a period of four months to compare the hazards of welding on plates primed with red lead primer and/or zinc chromate. The Navy uses lead-containing paints only on exterior steel surfaces. For the purposes of this study, some lead primer was applied within ships on bare metal and on zinc chromate coating. The conclusions obtained from this study were:

1. There is a lead hazard whenever welding or burning on lead-painted surfaces is done in confined spaces.
2. There is a fume hazard from welding or burning in such spaces regardless of coating.
3. There is no hazard from chromium oxides evolving from zinc chromate coated plates.
4. Overexposure to metal oxides from welding or burning on exterior surfaces is unlikely and is lessened when the worker can take advantage of prevailing winds.
5. Local exhaust ventilation can be effectively employed to remove welding fumes in confined space welding.

In addition to these atmospheric studies, lead-in-urine determinations were made on 30 welders or burners with known exposures to lead. Lead at a level of 0.02 to 0.12 mg. per liter of urine was found.

Vinyl Coatings. Many naval vessels contain vinyl coatings on their hull or on gasoline cargo tanks. These coatings introduce a serious hazard when welding or burning is done. The decomposition products found objectionable by workers include hydrogen chloride which was found in concentrations of 2 to 35 parts per million. To avoid exposures when welding or burning is to be done on vinyl-coated surfaces, the vinyl is removed by abrasive blasting, scraping, or chipping. On areas where vinyl coating precedes welding, an area of 3 inches on either side of the weld line is masked.

Chest X-Rays

The chest x-rays of all welders, burners, and shipfitters taken at the Boston Naval Shipyard during the calendar year 1957 were reviewed to evaluate the respiratory hazard associated with their environmental exposure. Shipfitters locate and position plates to be welded and assist in burning operations. Their exposure to oxidation products is considered equal to that of the welders and burners. The total group consisted of 1,083 men, exclusive of supervisory personnel, with employment in these trades ranging from 6 to 41 years for an average of approximately 18 years.

The roentgenologist concluded that the x-rays were uninformative as regards any pathology which could be directly attributed to occupations.

Summary

The experience of naval shipyards with regard to welding and burning procedures is summarized briefly. The experience covers practically every

type of welding and burning process, involving most of the material and coatings apt to be utilized in industrial plants in general, and includes a total exposed population of approximately 66,000 employees.

Recognizing the inherent hazards involved in welding and burning, the Navy has pursued an active course of education, indoctrination, and protection of all employees engaged in this work. That such a policy not only can but does work, has been demonstrated by the remarkably low incidence of those physical conditions usually manifested in unprotected and uninformed employees.

The stringent and careful utilization of sound industrial hygiene principles has practically eliminated the welding and burning occupations from the long list of hazardous occupations. (Storlazzi, E.D., B.S., Hygiene of Welding in U.S. Naval Shipyards: A.M.A. Arch. Indust. Health, 19: 307-311, March 1959)

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Hazards of Exposure to Ozone

A reappraisal of the hazards associated with exposure to ozone was made by the Toxicological Services of the Occupational Health Field Headquarters, Cincinnati, Ohio, because of the following coincident factors:

1. A resurgence in the sale of ozonizers as "air purifiers"
2. Introduction of a new shielded arc-welding process
3. Discovery of ozone as a key factor in oxidant smog

Based on animal studies, the injurious effects of ozone exposure tend to be augmented by the youth and physical exertion of the animal, the presence of respiratory infection, and the inhalation of other gases in conjunction with ozone. Factors which either reduce or abolish the injurious effects of ozone are intermittent exposure, premedication with specific compounds, pre-exposure to more general types of substances, such as oil mists or simultaneous exposure to sulfur compounds. A remarkable tolerance to the acute effects of ozone develops rapidly and is durable (100 days in mice).

Further conclusions from the animal studies show that the most serious aspect of exposure to ozone is its chronic effect. Irreversible changes in the lungs of small animals—except the dog—have been shown to occur from the daily exposure for one year to very low levels of ozone (1 part per million (ppm)).

More rapid aging associated with progressively decreased respiratory function, altered alkaline phosphatase activity of lung tissue, and changes in the nucleic acid residues of the lungs occur early in the exposure. The formation of increasing titers of antibodies are also associated with inhalation of ozone—an important reaction heretofore unrecognized. The weight of evidence fully justifies the reduction of the threshold limit for ozone in

air for industry to 0.1 ppm as set by the American Conference of Governmental Industrial Hygienists. Despite repeated claims of medical benefits from ozone, no experimental evidence is forthcoming to indicate that the benefits derived would outweigh the demonstrated hazards to health. (Abstract from address by H. E. Stokinger, Ph. D., The Hazards of Exposure to Ozone: Indust. Hyg. News Rep., II, 1-2, March 1959)

* * * * *

Solvents

Organic solvents of many types are used in vast quantities in modern industrial processes and for cleaning. The number of solvents now on the market is enormous and new ones are being developed. Practically all of them are flammable or toxic, or both.

The problem is to select the solvent that will do the job with the least hazard to personnel and property and surround its use with all possible safeguards.

Safety measures include ventilation, personal protective equipment, facilities for personal cleanliness, and medical supervision. Solvents are used in various manufacturing processes to dissolve pigments, glues, plastics, and other materials. Straight solvents are needed where water cannot be used, as on electrical equipment.

Organic solvents are those which contain the element carbon with no metallic or basic element. They are classified in four main groups:

Hydrocarbons

Esters and ketones

Alcohols

Chlorinated solvents

In addition to solvent power, other properties may be important to the user. Flash point, toxicity, speed of evaporation, and cost must be considered.

Properties of Solvents

From the standpoint of safety, the two most important properties of solvents are the flash point and the maximum allowable concentration. Flash points given in most tables are determined by the closed cup method. These are always lower than those determined in an open cup.

Toxicity is measured by maximum allowable concentration (MAC) in parts per million (ppm) of solvent that can contaminate the air in a room for extended periods without endangering the occupants. Speed of evaporation is also an important factor in toxicity. A solvent of low volatility is generally less hazardous than one of high volatility with the same MAC.

Many excellent solvents are not safe for general use. Carbon tetrachloride, for example, is nonflammable, but its fumes are highly poisonous. Benzol is too toxic and too flammable for general use.

A wide range of petroleum hydrocarbons is available for cleaning. Some are marketed under trade names or numbers. They are relatively nontoxic with MAC around 500 ppm and flashpoints up to 150° F.

All organic solvents should be regarded as toxicants and used only where proper ventilation is provided. Because solvents dissolve fats and oils, they naturally defat the skin, therefore, workers who are engaged in these processes should be provided with protective gloves or creams. (Safety with Solvents: National Safety News, 79: 65-67, March 1959)

* * * * *

Physical Examinations

The value of periodic physical examinations is no longer questioned. While the practice has been well established in the military services and by many corporations in this country, there are many individuals who for reasons of their own do not concern themselves with regular physical examinations.

The life expectancy of people of the United States has increased so much since the turn of the century that many who would have died at a younger age are now getting into an old age bracket.

Older age brings its diseases, too. Numbered among these are cardiac conditions, arteriosclerosis, and cancer.

Ferreting out cancer cases in time to do something about them requires the combined efforts of the public, the medical and dental profession, and their associated services. Modern methods of treatment saved an estimated 150,000 persons last year, and even more can be saved if there is earlier recognition of the signs of cancer. On the other hand, new cases are diagnosed at the rate of 450,000 a year, and at all times some 700,000 persons are under treatment for cancer. If the trend is unchecked, some 40 million persons now living will develop cancer and 26 million of them will die of it. The public must be made more aware of the signs of cancer. Careful history taking prior to physical examinations may develop leads to its early recognition.

The person who presents himself for medical or dental treatment or for physical examination should also receive a health lesson from the physician. There are other diseases besides cancer that a person should be advised about. The medical officer or physician has a rare opportunity to sow a few words of wisdom. These may be for the individual under examination or, who knows, they may be spread along the way to reach others.

Complete physical examinations cannot be made rapidly. Such examinations cost money but should pay good dividends. (Editorial, Physical Examinations: Mil. Med., 124: 301, April 1959) (The leading site of cancer today is the colon and rectum. American Cancer Society)

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Two Months Course in Occupational Medicine

The Institute of Industrial Medicine, Post-Graduate Medical School, New York University-Bellevue Medical Center is offering a two-months' course in occupational medicine, 14 September through 6 November 1959.

The course is designed for physicians engaged in the practice of occupational medicine. Some subjects to be covered are:

Preventive Medicine

Preventive Medicine and Public Health
Principles of Aviation Medicine
Rehabilitation

Administrative Medicine

History and Philosophy of Medicine in Industry
Interdepartmental Relationships
Physician-Community Relationships
Personnel Administration
The Nurse in Industry
Organizations Concerned with Occupational Health
Legal Aspects
Health Insurance and Retirement Plans
Case Studies

Occupational Diseases

Metal Poisoning

The Pneumoconioses

Dermatoses

Solvent Intoxication

Disabling Effects of Gases

Toxicology of Economic Poisons

Biological Effects of Physical

Hazards

Accidents and Occupational

Injury

Medical Aspects of Workmen's

Compensation

Industrial Hygiene

Philosophy of Industrial Hygiene

Control

Hazardous Agents

Threshold Limits

Sampling Analyses

Methods of Control

Air Pollution

Plant Surveys

Naval occupational Medical officers may apply for this course in accordance with instructions contained in BuMed Instruction 1520.8 of 6 February 1956; naval civilian physicians similarly engaged may apply in accordance with NCPI 230.6

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Industrial Environment Manual

"The Industrial Environment - Its Evaluation and Control," (PHS Publication No. 614) is a 364-page syllabus devoted primarily to fundamental principles and methods employed in the evaluation and control of the working environment. Copies of the syllabus may be obtained from: Superintendent of Documents, Government Printing Office, Washington 25, D. C. The cost is \$2.75 per copy.

The Surgeon General Congratulates Officers
of the Medical Service Corps

"On the occasion of the twelfth anniversary of the establishment of the Medical Service Corps of the Navy, I extend hearty congratulations to all members of the Corps, wherever you may be.

At such a milestone it is refreshing to look back and review the accomplishments of the many fine officers who individually and as a group have contributed so much to the renown of the Medical Department. In direct patient care, in administration, in environmental protection, in research—in the thousand and one tasks of increasing responsibility, Medical Service Corps officers have distinguished themselves and have richly earned a resounding 'Well done!'

This is also an occasion for looking forward and for resolving to add to the lustre of your Corps' reputation. I have every confidence that you will do so and that by continuing self-improvement your varied skills will be brought to bear in full measure on the many and vital responsibilities we face. No matter what new demands confront us, I know that full reliance may be placed on your abiding loyalty, zeal, and devotion."

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